ALGEBRA PROBLEM SESSION #11 SOLUTIONS

Radical Equations

1. $\sqrt{x^2 - 4x + 4} = x - 2$, unless $x < 2$.

2. If both sides of an equation are raised to the same even power, then the resulting equation might not be equivalent to the original equation because of the introduction of extraneous solutions.

3. You must check each apparent solution of a radical equation, because of the introduction of extraneous solutions and/or because the apparent solution is not in the domain of the radical function in the equation.

4. $(\sqrt{x-3} + 5)^2 \neq x^2$
   $(\sqrt{x-3} + 5)^2 = x + 22 + 10\sqrt{x-3}$

5. $x = 0$ or $x = 4$

6. (a) $x = 5$ (b) $x = 2$

7. (a) No solution (b) 12 (c) 1 (d) 32 (e) $x = 3$ or $x = 7$

   (f) 39 (g) –2 (h) $x = 2$ or $x = 4$

Complex Numbers

1. The sum of two imaginary numbers, $a_1 + b_1 i$ and $a_2 + b_2 i$ (both not pure imaginary numbers) will be a pure imaginary number, when $a_1 = -a_2$.

2. Given two complex numbers: $a_1 + b_1 i$ and $a_2 + b_2 i$, their quotient will be real when $a_1 b_2 = a_2 b_1$.

3. Given two complex numbers: $a_1 + b_1 i$ and $a_2 + b_2 i$, they will be equal when $a_1 = a_2$ and $b_1 = b_2$.

4. A complex number of the form $a + bi$ has a complex conjugate of the form $-bi$.
   The complex conjugate of $7 - 2i$ is $7 + 2i$.

5. (a) $0 + \sqrt{21}i$ (b) $7 + 2i$

6. $9 + 3i$ 7. $-16 + 16i$ 8. $-12 + 26i$ 9. $-32 - 24i$ 10. $-9 + 48i$

11. 28 12. –8 13. $-\frac{15}{13} + \frac{10}{13}i$ 14. $\frac{17}{13} + \frac{7}{13}i$

15. –1 16. 1 17. –1